

Union Calendar No. 17

109TH CONGRESS
1ST SESSION

H. R. 28

[Report No. 109–36]

To amend the High-Performance Computing Act of 1991.

IN THE HOUSE OF REPRESENTATIVES

JANUARY 4, 2005

Mrs. BIGGERT (for herself, Mr. DAVIS of Tennessee, and Mr. BOEHLERT)
introduced the following bill; which was referred to the Committee on Science

APRIL 12, 2005

Additional sponsors: Mr. GORDON, Mr. INGLIS of South Carolina, Ms.
HOOLEY, and Mr. JOHNSON of Illinois

APRIL 12, 2005

Reported with an amendment, committed to the Committee of the Whole
House on the State of the Union, and ordered to be printed

[Strike out all after the enacting clause and insert the part printed in italics]

[For text of introduced bill, see copy of bill as introduced on January 4, 2005]

A BILL

To amend the High-Performance Computing Act of 1991.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

1 **SECTION 1. SHORT TITLE.**

2 *This Act may be cited as the “High-Performance Com-*
3 *puting Revitalization Act of 2005”.*

4 **SEC. 2. FINDINGS.**

5 *Section 2 of the High-Performance Computing Act of*
6 *1991 (15 U.S.C. 5501) is amended by adding at the end*
7 *the following new paragraph:*

8 *“(10) Commercial application of the results of*
9 *Federal investment in basic and computing science is*
10 *consistent with longstanding United States technology*
11 *transfer policy and is a critical national priority,*
12 *particularly with regard to cybersecurity and other*
13 *homeland security applications, because of the urgent*
14 *needs of commercial, academic, and individual users*
15 *as well as the Federal and State Governments.”.*

16 **SEC. 3. DEFINITIONS.**

17 *Section 4 of the High-Performance Computing Act of*
18 *1991 (15 U.S.C. 5503) is amended—*

19 *(1) in paragraph (2), by inserting “and multi-*
20 *disciplinary teams of researchers” after “high-per-*
21 *formance computing resources”;*

22 *(2) in paragraph (3)—*

23 *(A) by striking “scientific workstations,”;*

24 *(B) by striking “(including vector super-*
25 *computers and large scale parallel systems)”;*

1 (C) by striking “and applications” and in-
 2 serting “applications”; and

3 (D) by inserting “, and the management of
 4 large data sets” after “systems software”;

5 (3) in paragraph (4), by striking “packet
 6 switched”; and

7 (4) by amending paragraphs (5) and (6) to read
 8 as follows:

9 “(5) ‘Program’ means the High-Performance
 10 Computing Research and Development Program de-
 11 scribed in section 101; and

12 “(6) ‘Program Component Areas’ means the
 13 major subject areas under which are grouped related
 14 individual projects and activities carried out under
 15 the Program.”.

16 **SEC. 4. HIGH-PERFORMANCE COMPUTING RESEARCH AND**
 17 **DEVELOPMENT PROGRAM.**

18 Title I of the High-Performance Computing Act of
 19 1991 (15 U.S.C. 5511 et seq.) is amended—

20 (1) in the title heading, by striking “**AND**
 21 **THE NATIONAL RESEARCH AND EDU-**
 22 **CATION NETWORK**” and inserting “**RE-**
 23 **SEARCH AND DEVELOPMENT**”;

24 (2) in section 101—

1 (A) the section heading, by striking “**NA-**
 2 **TIONAL HIGH-PERFORMANCE COMPUTING**”
 3 and inserting “**HIGH-PERFORMANCE COM-**
 4 **PUTING RESEARCH AND DEVELOPMENT**”;

5 (B) in subsection (a)—

6 (i) in the subsection heading, by strik-
 7 ing “*NATIONAL HIGH-PERFORMANCE COM-*
 8 *PUTING*” and inserting “*HIGH-PERFORM-*
 9 *ANCE COMPUTING RESEARCH AND DEVEL-*
 10 *OPMENT*”;

11 (ii) by striking paragraphs (1) and (2)
 12 and inserting the following: “(1) The Presi-
 13 dent shall implement a High-Performance
 14 Computing Research and Development Pro-
 15 gram, which shall—

16 “(A) provide for long-term basic and applied re-
 17 search on high-performance computing;

18 “(B) provide for research and development on,
 19 and demonstration of, technologies to advance the ca-
 20 pacity and capabilities of high-performance com-
 21 puting and networking systems;

22 “(C) provide for sustained access by the research
 23 community in the United States to high-performance
 24 computing systems that are among the most advanced
 25 in the world in terms of performance in solving sci-

1 *entific and engineering problems, including provision*
2 *for technical support for users of such systems;*

3 *“(D) provide for efforts to increase software*
4 *availability, productivity, capability, security, port-*
5 *ability, and reliability;*

6 *“(E) provide for high-performance networks, in-*
7 *cluding experimental testbed networks, to enable re-*
8 *search and development on, and demonstration of, ad-*
9 *vanced applications enabled by such networks;*

10 *“(F) provide for computational science and engi-*
11 *neering research on mathematical modeling and algo-*
12 *rithms for applications in all fields of science and en-*
13 *gineering;*

14 *“(G) provide for the technical support of, and re-*
15 *search and development on, high-performance com-*
16 *puting systems and software required to address*
17 *Grand Challenges;*

18 *“(H) provide for educating and training addi-*
19 *tional undergraduate and graduate students in soft-*
20 *ware engineering, computer science, computer and*
21 *network security, applied mathematics, library and*
22 *information science, and computational science; and*

23 *“(I) provide for improving the security of com-*
24 *puting and networking systems, including Federal*

1 *systems, including research required to establish secu-*
2 *rity standards and practices for these systems.”;*

3 *(iii) by redesignating paragraphs (3)*
4 *and (4) as paragraphs (2) and (3), respec-*
5 *tively;*

6 *(iv) in paragraph (2), as so redesign-*
7 *ated by clause (iii) of this subparagraph—*

8 *(I) by striking subparagraph (B);*

9 *(II) by redesignating subpara-*
10 *graphs (A) and (C) as subparagraphs*
11 *(D) and (F), respectively;*

12 *(III) by inserting before subpara-*
13 *graph (D), as so redesignated by sub-*
14 *clause (II) of this clause, the following*
15 *new subparagraphs:*

16 *“(A) establish the goals and priorities for Fed-*
17 *eral high-performance computing research, develop-*
18 *ment, networking, and other activities;*

19 *“(B) establish Program Component Areas that*
20 *implement the goals established under subparagraph*
21 *(A), and identify the Grand Challenges that the Pro-*
22 *gram should address;*

23 *“(C) provide for interagency coordination of*
24 *Federal high-performance computing research, devel-*

1 *opment, networking, and other activities undertaken*
 2 *pursuant to the Program;”; and*

3 *(IV) by inserting after subparagraph*
 4 *(D), as so redesignated by subclause (II) of*
 5 *this clause, the following new subparagraph:*

6 *“(E) develop and maintain a research, develop-*
 7 *ment, and deployment roadmap for the provision of*
 8 *high-performance computing systems under para-*
 9 *graph (1)(C); and”; and*

10 *(v) in paragraph (3), as so redesign-*
 11 *ated by clause (iii) of this subparagraph—*

12 *(I) by striking “paragraph*
 13 *(3)(A)” and inserting “paragraph*
 14 *(2)(D);”;*

15 *(II) by amending subparagraph*
 16 *(A) to read as follows:*

17 *“(A) provide a detailed description of the Pro-*
 18 *gram Component Areas, including a description of*
 19 *any changes in the definition of or activities under*
 20 *the Program Component Areas from the preceding re-*
 21 *port, and the reasons for such changes, and a descrip-*
 22 *tion of Grand Challenges supported under the Pro-*
 23 *gram;”;*

24 *(III) in subparagraph (C), by*
 25 *striking “specific activities” and all*

1 that follows through “the Network” and
 2 inserting “each Program Component
 3 Area”;

4 (IV) in subparagraph (D), by in-
 5 serting “and for each Program Compo-
 6 nent Area” after “participating in the
 7 Program”;

8 (V) in subparagraph (D), by
 9 striking “applies;” and inserting “ap-
 10 plies; and”;

11 (VI) by striking subparagraph (E)
 12 and redesignating subparagraph (F) as
 13 subparagraph (E); and

14 (VII) in subparagraph (E), as so
 15 redesignated by subclause (VI) of this
 16 clause, by inserting “and the extent to
 17 which the Program incorporates the
 18 recommendations of the advisory com-
 19 mittee established under subsection (b)”
 20 after “for the Program”;

21 (C) in subsection (b)—

22 (i) by redesignating paragraphs (1)
 23 through (5) as subparagraphs (A) through
 24 (E), respectively;

1 (ii) by inserting “(1)” after “ADVISORY
2 COMMITTEE.—”;

3 (iii) in paragraph (1)(C), as so rededesignated
4 by clauses (i) and (ii) of this subparagraph, by inserting “, including funding
5 levels for the Program Component Areas” after “of the Program”;

6 (iv) in paragraph (1)(D), as so redesignated by clauses (i) and (ii) of this
7 subparagraph, by striking “computing” and inserting “high-performance computing and
8 networking”; and

9 (v) by adding at the end the following
10 new paragraph:

11 “(2) In addition to the duties outlined in paragraph
12 (1), the advisory committee shall conduct periodic evaluations of the funding, management, coordination, implementation, and activities of the Program, and shall report not
13 less frequently than once every two fiscal years to the Committee on Science of the House of Representatives and the
14 Committee on Commerce, Science, and Transportation of the Senate on its findings and recommendations. The first
15 report shall be due within one year after the date of enactment of this paragraph.”; and

1 (D) in subsection (c)(1)(A), by striking
2 “Program or” and inserting “Program Compo-
3 nent Areas or”; and
4 (3) by striking sections 102 and 103.

5 **SEC. 5. AGENCY ACTIVITIES.**

6 Title II of the High-Performance Computing Act of
7 1991 (15 U.S.C. 5521 et seq.) is amended—

8 (1) by amending subsection (a) of section 201 to
9 read as follows:

10 “(a) *GENERAL RESPONSIBILITIES.*—As part of the
11 Program described in title I, the National Science Founda-
12 tion shall—

13 “(1) support research and development to gen-
14 erate fundamental scientific and technical knowledge
15 with the potential of advancing high-performance
16 computing and networking systems and their applica-
17 tions;

18 “(2) provide computing and networking infra-
19 structure support to the research community in the
20 United States, including the provision of high-per-
21 formance computing systems that are among the most
22 advanced in the world in terms of performance in
23 solving scientific and engineering problems, and in-
24 cluding support for advanced software and applica-

1 *tions development, for all science and engineering dis-*
 2 *ciplines; and*

3 *“(3) support basic research and education in all*
 4 *aspects of high-performance computing and net-*
 5 *working.”;*

6 *(2) by amending subsection (a) of section 202 to*
 7 *read as follows:*

8 *“(a) GENERAL RESPONSIBILITIES.—As part of the*
 9 *Program described in title I, the National Aeronautics and*
 10 *Space Administration shall conduct basic and applied re-*
 11 *search in high-performance computing and networking,*
 12 *with emphasis on—*

13 *“(1) computational fluid dynamics, computa-*
 14 *tional thermal dynamics, and computational aero-*
 15 *dynamics;*

16 *“(2) scientific data dissemination and tools to*
 17 *enable data to be fully analyzed and combined from*
 18 *multiple sources and sensors;*

19 *“(3) remote exploration and experimentation;*
 20 *and*

21 *“(4) tools for collaboration in system design,*
 22 *analysis, and testing.”;*

23 *(3) in section 203—*

24 *(A) by striking subsections (a) through (d)*
 25 *and inserting the following:*

1 “(a) *GENERAL RESPONSIBILITIES.*—As part of the
2 Program described in title I, the Secretary of Energy
3 shall—

4 “(1) conduct and support basic and applied re-
5 search in high-performance computing and net-
6 working to support fundamental research in science
7 and engineering disciplines related to energy applica-
8 tions; and

9 “(2) provide computing and networking infra-
10 structure support, including the provision of high-per-
11 formance computing systems that are among the most
12 advanced in the world in terms of performance in
13 solving scientific and engineering problems, and in-
14 cluding support for advanced software and applica-
15 tions development, for science and engineering dis-
16 ciplines related to energy applications.”; and

17 (B) by redesignating subsection (e) as sub-
18 section (b);

19 (4) by amending subsection (a) of section 204 to
20 read as follows:

21 “(a) *GENERAL RESPONSIBILITIES.*—As part of the
22 Program described in title I—

23 “(1) the National Institute of Standards and
24 Technology shall—

1 “(A) conduct basic and applied metrology
2 research needed to support high-performance
3 computing and networking systems;

4 “(B) develop benchmark tests and standards
5 for high-performance computing and networking
6 systems and software;

7 “(C) develop and propose voluntary stand-
8 ards and guidelines, and develop measurement
9 techniques and test methods, for the interoper-
10 ability of high-performance computing systems
11 in networks and for common user interfaces to
12 high-performance computing and networking
13 systems; and

14 “(D) work with industry and others to de-
15 velop, and facilitate the implementation of, high-
16 performance computing applications to solve
17 science and engineering problems that are rel-
18 evant to industry; and

19 “(2) the National Oceanic and Atmospheric Ad-
20 ministration shall conduct basic and applied research
21 on high-performance computing applications, with
22 emphasis on—

23 “(A) improving weather forecasting and cli-
24 mate prediction;

1 “(B) collection, analysis, and dissemination
2 of environmental information; and

3 “(C) development of more accurate models
4 of the ocean-atmosphere system.”; and

5 (5) by amending subsection (a) of section 205 to
6 read as follows:

7 “(a) *GENERAL RESPONSIBILITIES.*—As part of the
8 Program described in title I, the Environmental Protection
9 Agency shall conduct basic and applied research directed
10 toward advancement and dissemination of computational
11 techniques and software tools for high-performance com-
12 puting systems with an emphasis on modeling to—

13 “(1) develop robust decision support tools;

14 “(2) predict pollutant transport and the effects of
15 pollutants on humans and on ecosystems; and

16 “(3) better understand atmospheric dynamics
17 and chemistry.”.

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